Manuscript title: OVERESTIMATION OF PEER DRINKING: ERROR OF JUDGMENT OR METHODOLOGICAL ARTEFACT?

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ABSTRACT

Aims: Examine whether inclusion of self *and* peer-referent items in the context of a single social norms drinking questionnaire plays an active role in producing the much-reported tendency for young people to overestimate the extent of peers' alcohol-related behaviour and the permissiveness of their attitudes towards alcohol. **Design, setting, participants and measurements**: In a between-subjects design pupils attending two Scottish secondary schools (N=1074; 12-18 years; 52.5% male) completed one of three questionnaires designed to measure a range of alcohol-related behaviours, attitudes and perceptions: A paradigmatic multiple-target questionnaire included self and peer-referent items while two single-target questionnaires included self-referent *or* peer-referent items only. **Findings:** Pupils' self-reported drinking behaviours and attitudes were similar regardless of whether multiple or single-target versions of the questionnaire were used, as were perceptions of peers' frequencies of alcohol use and drunkenness. In contrast, by comparison with pupils who responded to a single-target version that omitted self-referent items, use of a multiple-target questionnaire was significantly more likely to result in reports that peers would consume alcoholic drinks when with friends and hold more permissive or liberal attitudes towards alcohol. **Conclusions:** Social norms research and related health promotion programmes that seek to reduce the extent of overestimation of peer drinking norms are heavily reliant upon multiple-target drinking questionnaires. Use of such questionnaire may lead to more distorted or extreme perceptions being reported by pupils compared to single-target versions which omit self-referent drinking items. By implication, use of multiple-target questionnaires may encourage young people to 'over-overestimate' peer drinking norms.

A substantial body of American research documents a tendency for young people to overestimate the extent of peers' alcohol-related behaviours and the permissiveness of their attitudes towards alcohol [1-3]. Evidence that young people hold distorted perceptions of peer drinking norms is frequently based on responses to drinking questionnaires that ask young people about their own alcohol-related behaviours and attitudes *as well as* their perceptions of peers' alcohol-related behaviours and attitudes. The current research seeks to identify whether inclusion of self and peer-referent items in the context of a single social norms drinking questionnaire encourages such overestimation.

Given known tendencies towards group patterns and expectations [4], holding an inflated perception or "misperception" in relation to peer drinking norms predicts migration of behaviour upwards, towards those inflated perceptions [5]. Health promotion programmes based on, or incorporating social norms, seek to identify misperception among young people and encourage the adoption of realistic and healthy perceptions of peer drinking norms by feeding back accurate normative drinking information. It is argued that if perception can be brought into line with more realistic and healthy perceptions of the norm then young people's own attitudes and behaviour are likely to follow a similar path [6]. Despite a recent systematic review noting a lack of high-quality controlled studies in this field [7], social norms programmes are increasingly popular within US college campuses and schools [8]. There is also evidence that young people misperceive drinking norms in other cultural contexts [9-14] and that, social norms programmes may be implemented outside the US with some success [15].

For those working in applied health promotion settings, social norms programmes are attractive given the ease with which normative data can be collected and the programme

implemented and evaluated: A representative sample of the population respond to a simple questionnaire containing a battery of alcohol-related items targeting their own alcohol-related behaviours and attitudes (i.e., self-referent) and a similar or identical battery intended to record their perceptions of peers' alcohol-related behaviours and attitudes (i.e., peer-referent). Self-report responses are used to identify the 'actual' drinking norms within the population while peer-referent responses specify 'perceived' peer drinking norms. Where the actual drinking norm is moderate and healthy, yet perceptions of peer drinking norms are more extreme, actual normative drinking information extracted from questionnaire responses may be fed back to the population in an attempt to correct exaggerated perceptions. Subsequent evaluations of the effectiveness of the programme are likely to make use of similar or identical questionnaires to evaluate the impact of the intervention on perception and behaviour. As the process is cyclical this normative information constitutes up-to-date normative feedback which may be used in subsequent waves of the feedback programme [8]. Despite a heavy reliance on questionnaire-based methodology at each stage, little research has sought to examine the extent to which data collected as part of a typical social norms programme provides an accurate estimation of young people's physical and perceptual environments.

Researchers [16] have tended to explain the exaggerated nature of young people's perceptions through cognitive biases such as the fundamental attribution error [17]. Young people are conceived of as information processing organisms, albeit occasionally inefficient ones prone to errors in reasoning and logic, where limited information regarding other people's alcohol-related behaviours and attitudes can lead to inaccuracies when making judgments about them. From this perspective, discrepancies between young people's alcohol-related behaviours and attitudes and perceived peer norms constitute genuine errors of

judgment in young people's estimation of the prevalence and extent of peers' alcohol-related behaviours and attitudes.

In contrast, alternative lines of research suggest motivational or self-serving biases may also play an important role in alcohol consumption reports [18]. In numerous cases substance-use reports have been shown to be highly functional, varying in accordance with the perceived requirements, motivations and context of responses [19-21]. Furthermore, general rather than specific-to-substance-use research has shown that categorisation into groups on arbitrary and seemingly trivial bases can induce acts of in-group favouritism and out-group discrimination [22]. Work carried out into social comparison processes has also identified that individuals compare extensively with other individuals for a variety of reasons, including self-enhancement: *"While social comparison is often concerned with truly evaluating personal characteristics, sometimes self-serving motives come into play....constructive social comparison is often 'self-serving and it is typically engaged when people want to devise esteem-maintaining views of social reality"* ([23] p. 32). In one study, Klein and Kunda [24] found that by comparison with controls given no information about the frequency of peer engagement in 'health-threatening' behaviours such as alcohol consumption, college students provided with actual norms for their peer group adjusted their own self-reported frequencies downwards. Despite no instruction to attend to the normative information, participants reconstructed their own behaviours in order to maintain positive self-evaluations relative to peers.

Research of this type suggests the tendency for young people to misperceive peer-drinking norms may not result solely from errors when making judgments about others, but may also involve a motivational self-serving element. While use of a single questionnaire to record

young people's behaviours and attitudes as well as their perceptions of peers' behaviours and attitudes may be economically appealing and statistically powerful, the saliency of any comparison between self and peers on relevant alcohol-related variables is likely to be heightened. By implication, this practice may encourage motivated, self-serving responses that enable respondents to maintain positive social comparisons with peers. Given that evidence showing young people misperceive drinking norms is frequently based on questionnaire responses indicating a discrepancy between young people's self-reported behaviours and attitudes and their perceptions of peers' behaviours and attitudes, it seems prudent to investigate whether the paradigmatic format of questionnaire used in the field plays an active role in producing the apparent mismatch between perception and reality. If it is the case that young people's responses to social norms questionnaires are motivated to some degree by self-enhancement or self-presentation, it is likely that self-reported and perceived behaviours and attitudes will differ across questionnaires which vary the degree to which social comparison information is a salient feature. Thus, it is anticipated that responses to a conventional questionnaire incorporating self and peer-referent items will differ from responses to questionnaires which include self or peer-referent items only.

METHODS

Sampling

Pupils of mixed age and gender attending two publicly funded Scottish secondary schools from the NHS Forth Valley region responded to one of three questionnaires designed to measure alcohol-related behaviours, attitudes and perceptions. The schools were selected on the basis of local authority and head teacher support, were matched for age of school, socioeconomic status and were both non-denominational. Data collection took place in April 2009 when pupil rolls stood at 1206 and 700. Based on the percentage of pupils eligible to receive free school meals, those attending the two schools (14.2; 14.8%) were slightly more

deprived compared to local authority and national averages (12.2%; 12.9%) [25], and most at either school (97.19%; 94.13%) identified themselves as White-British which is also slightly above the national secondary school average (93.84%) [26].

Design and measures

The standard social norms paradigm involves collection of self and peer-referent data using a single questionnaire – a within-subjects design. To investigate whether this design has an impact on pupils' responses, three different versions of a social norms questionnaire were developed for use in a between-subjects experimental design. One questionnaire, similar in design and format to that used in the standard social norms paradigm, included both self and peer-referent items to record pupils' self-reported alcohol-related behaviours and attitudes in addition to their perceptions of those alcohol-related behaviours and attitudes for 'the typical pupil' in their year (i.e., a multiple-target/MT version). Two further questionnaires split this format and included items to record the alcohol-related behaviours and attitudes of a single target in each case (i.e., single-target 'self'/ST-self *or* single-target 'peer'/ST-peer versions).

The battery of social norms items used in this research was based on those found in sample questionnaires available in *A Guide to Marketing Social Norms for Health Promotion in Schools and Communities* [27]. Therefore, included items are likely to be representative of those used in applied social norms health promotion programmes. Although questionnaires contained various alcohol-related measures, only those likely to be used as part of a social norms campaign to correct pupil misperceptions were of interest. Behavioural items of interest were (a) the usual type of drink consumed when with friends, based on eight alcoholic and non-alcoholic drink response options. Pupils who had ever consumed more than a few sips of alcohol also provided (b) past 30-day frequencies of consumption and (c) past 30-day frequencies of drunkenness information using 7-point ordinal scales ranging from

never in the past 30 days (coded 1) to *every day of the week* (coded 7). Eight attitudinal items required pupils to state degree of agreement on a 4-point scale ranging from *strongly disagree* (coded 1) to *strongly agree* (coded 4) with statements such as 'There is nothing wrong with people under 18 years drinking alcohol every now and then' and 'I need to have a drink of alcohol in order to have a good time'. In all cases self and peer-referent item strings were identical, varying only the target-referent (e.g., When *you* are with your friends, what do *you* usually drink? vs. When *they* are with friends, what do you think the *typical pupil* in your year usually drinks?).

Procedure

Questionnaires were completed in classes of medium size (21 pupils) under exam conditions. Classroom teachers who were blind to the experimental manipulation received equal numbers of the three types of questionnaire, the order of which had been randomised by hand by members of the research team prior to enclosing each in an unmarked envelope. Teachers and questionnaire headers stressed the anonymous nature of responses and that pupils were under no obligation to complete questionnaires. Pupils sealed completed questionnaires inside envelopes before returning them.

RESULTS

Notwithstanding exam commitments, absences, and opting out, complete data were available for 56.88% and 55.43% of each school roll, a total of 1074 pupils (52.5% male). Questionnaires were completed by pupils of all ages (12-18 years), the average was 14 years and 5 months (SD = 1 year and 7 months). Of the three types of questionnaire, 371 pupils (34.5%) responded to the MT version, 358 (33.3%) to the ST-self version and 345 (32.8%) to the ST-peer version. Composition of the three groups did not differ significantly by age, F (2, 1052) = 0.08, p = 0.93, or gender, χ^2 (2, N = 1073) = 4.33, p = 0.12, though male responses

were more heavily represented in ST-self (55% male) and ST-peer (54.5% male) versions than in the MT (48.1% male) version.

Usual drink type

After collapsing into an alcoholic drink versus non-alcoholic drink dichotomy, self and peer-referent responses to the usual type of drink item were compared across questionnaire type. The results of each comparison, detailed in Table 1, indicate virtually no difference in the proportion of MT or ST-self version respondents who reported use of alcoholics drinks themselves. In contrast, when pupils were asked about their perceptions of the typical pupil's usual drink choice, the odds of MT respondents stating that peers would consume alcoholic drinks were twice those of pupils who responded to the ST-peer version of the questionnaire.

INSERT TABLE 1 (APPENDED)

Past 30-day frequency of consumption and drunkenness

Table 2 presents the results of comparisons made across questionnaire type for self-reported and perceived past 30-day frequencies of consumption and drunkenness. Although pupils who responded to the ST-self version (Median, zero occasions) reported less frequent consumption during the past 30-days compared to MT respondents (Median, one occasion) this difference was not significant. There was also no difference between MT and ST questionnaire responses in pupils' perceptions of the typical pupil's frequency of consumption (Medians, four occasions), self-reported past 30-day frequency of drunkenness (Medians, never), or perceptions of the typical pupil's past 30-day frequency of drunkenness (Medians, four occasions). In other words, self-reported frequencies of drinking and drunkenness and perceived frequencies of drinking and drunkenness were similar regardless of whether single or multiple-target versions of the questionnaire were used.

INSERT TABLE 2 (APPENDED)

Attitudes towards alcohol

Self-reported and perceived attitude responses to the single and multiple-target versions of the questionnaire were examined using two composite index scores. On six of the eight attitude items agreement ratings were scored as *strongly disagree* (1), *disagree* (2), *agree* (3) and *strongly agree* (4). Remaining items were reverse scored. Self and peer-referent attitude-item scores were then summed separately with a higher score on the index indicating more liberal or permissive attitudes or perceived attitudes towards alcohol and lower scores indicating more moderate or conservative attitudes or perceived attitudes towards alcohol. Cronbach's alpha indicated a satisfactory degree of internal consistency for both self and peer-referent scales (α = 0.77 - 0.81). Consistent with preceding analyses, Table 3 indicates that self-referent scores were similar across MT and ST versions of the questionnaire. On the other hand, peer-referent scale scores derived from responses to the MT version were significantly higher than those who responded to the ST-peer version. In short, whether multiple or single-target versions of the questionnaire were used to collect information on pupils' self-reported attitudes made little difference to the type of response given. In contrast, completing a multiple-target questionnaire resulted in pupils reporting a more permissive set of perceived attitudes for the typical pupil.

INSERT TABLE 3 (APPENDED)

DISCUSSION

Although pupils' self-reported alcohol-related behaviours and attitudes are robust across multiple and single-target versions of a social norms drinking questionnaire, in comparison to a version which only includes questions about peer-behaviour and attitudes, use of a multiple-target version results in a more extreme set of perceptions over several key items. In the

context of a social norms questionnaire comprising self and peer-referent alcohol-related items, social comparison information is a more salient feature of the questionnaire which may foster an environment where management of contextually-relevant needs and motivations is encouraged, a position overlooked in the social norms field to date.

Evidence that young people misperceive peer-drinking norms is often derived from research utilising multiple-target questionnaires, yet the current results question the extent to which multiple-target drinking questionnaires should be considered, apriori, suitable tools for measuring perceived drinking norms. Although speculation over which type of questionnaire produces the more 'real' or 'meaningful' set of data remains tempting, at this point it may only be stated that two methods of collecting normative drinking information, which cannot be distinguished in wording or content of relevant items, produced marked differences over several normative perception items. Further work is therefore necessary to examine the conditions under which normative data are robust. This work should proceed on the basis that reports of perceived norms which remain consistent, despite basic changes in the context of data collection, are less likely to be artefacts of specific data collection tools or elicitation settings [28]. Work currently underway in our lab addresses this issue to some extent by examining variability in university student responses to social norms questionnaires when these are collected across different environmental settings. Importantly, this methodological approach runs counter to that typically endorsed in the social norms field where it is argued that measures used to evaluate programme impact should resemble or mirror those used to collect baseline data [8, 5]. In fact, while such a procedure may improve reliability of responses, in the absence of corroborating information, it also enables methodological artefacts to remain undetected.

Prevention programmes making use of normative feedback to correct overestimated drinking norms are an increasingly popular method of attempting to reduce alcohol-related harm among young people. Unfortunately, limited resources may require that feedback of normative information is targeted selectively at overestimated norms where the magnitude of overestimation appears most severe. The current results indicate that over several items a more extreme set of perceptions were reported by those who responded to a multiple-target questionnaire, thereby increasing the magnitude and apparent severity of pupils' overestimation of the norm. Consequently, use of multiple-target questionnaires may pose a risk to prevention programmes if specific alcohol-related behaviours or attitudes are targeted to receive normative feedback over others because the degree of overestimation *appears* to be more severe. Few researchers would argue that the allocation and direction of valuable resources should be a matter solely for prevention experts and allowing methodological bias to influence this process would be highly undesirable.

In contrast to perceptions of peer attitudes and the usual type of drink consumed by peers, pupils' self-reported behaviours and attitudes were similar across questionnaires, and this was also true of perceptions of peer consumption and drunkenness. In general, self-report responses may be more robust than perception responses because pupils are more knowledgeable about their own alcohol-related behaviours and attitudes than they are about those of their peers'. It is also likely to be the case that pupils are more knowledgeable about certain aspects of their peers' alcohol-related worlds than others. For instance, perceptions of past 30-day frequencies of consumption and drunkenness can to some extent be based on observations of the relevant behaviour. In contrast, accurately judging peer attitudes towards drinking is a more difficult process requiring young people to identify the cognitive structures underlying peer behaviour. Therefore, where respondents are less knowledgeable about the

area in question, responses may be more malleable and sensitive to self-serving motivations because 'the facts' do not get in the way so much.

Although pupils' frequencies of consumption and drunkenness reports were robust to the experimental manipulation this finding may be of limited benefit to those working in the applied field. Particularly among school-aged children, ethical considerations may preclude use of normative feedback considered to be unhealthy or undesirable. Even where a moderate degree of alcohol use is the norm, those working in applied settings may be reluctant to feed norms of this category back to young people. As a result, attitudinal norms may be preferred in settings such as secondary schools where a degree of alcohol use may in fact be normal. The extent to which perceptions of attitudinal norms are robust to changes in questionnaire structure is timely given recent interest in norms of this type as a means of reducing alcohol consumption and related harm among college students in the US [29-31]. Although statistically significant, the mean difference of 1.5 scale points in peer-referent attitude scores may appear limited in terms of practical importance. Here it is instructive to note that self and peer-referent scores collected using the conventional multiple-target instrument differed only by 3.4 scale points. Therefore, the difference across questionnaire type of 1.5 scale points reported in the present study clearly erodes the degree of this overestimation and represents a substantive effect.

It has been stated elsewhere that the data collection stages of social norms programmes offer valuable opportunity for young people to reflect on their alcohol-related behaviours and attitudes, making the process a worthy endeavour in its own right [16]. Paradoxically, given the major premise of social norms research, *that situations perceived to be real are real in their consequences,* repeated use of multiple-target questionnaires may in fact contribute

toward the problems which social norms programmes try to address by creating an environment where a more extreme set of perceptions are included in young people's reflections on their alcohol-related behaviour and attitudes.

Possible limitations to this research include the uniform self-then-peer order of presentation of target-referents in the multiple-target version of the questionnaire which fails to control for possible ordering effects. While research conducted by Baer et al [1] found no effect of presentation order on college students' responses to drinking norms items, differences between the samples and normative measures used by Baer et al and this study mean their findings may not be entirely generalisable to those reported here. Nevertheless, the self-then-peer order of presentation used in this research was consistent with sample questionnaires contained in a popular social norms programming handbook and is an appropriate example of that used in applied social norms research. Based on the number of pupils eligible to receive free schools meals, the two schools used in this research were slightly more deprived than regional and national averages and also included a higher proportion of pupils identifying themselves as White-British. Furthermore, as most published social norms research has been carried out in the US where the cultural context of young people's alcohol use may differ from that found in the UK, motivations surrounding young people's responses to social norms questionnaires may also differ. Consequently, this research would benefit from replication at other institution and among other cohorts in different geographical and cultural contexts.

To conclude, social norms research and related health promotion programmes are heavily reliant on drinking questionnaires which ask young people to respond to questions about their own alcohol-related behaviours and attitudes as well as their perceptions of peers' behaviours

and attitudes. Use of this format of questionnaire has been shown to result in a more extreme or exaggerated set of perceptions over several key alcohol-related items when compared to an alternative format which includes questions about peers only. Further research is warranted to more closely examine the potentially active role of researcher-imposed methodologies in encouraging the overestimation of young people's alcohol-related perceptions.

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Tables to be inserted

Table 1 Pupils reporting consumption of alcoholic drinks with friends according to target and questionnaire version.

Target	*Percent alcoholic-drinks*		χ^2	*OR (95% CI)*
	MT	ST		
Self-referent	19.1	20.5	0.23^{ns}	0.91
	n=351	n=336		(95% CI 0.63, 1.33)
Peer-referent	56.5	37.5	24.32*	2.16
	n=354	n=320		(95% CI 1.59, 2.95)

*p <0.001, ^{ns}p>0.05. MT/ST: Multiple/single-target versions of the questionnaire; χ^2: Pearson's Chi-square; OR: Odds ratio associated with MT questionnaire respondents reporting consumption of alcohol drinks relative to ST respondents; CI: Confidence Interval.

Table 2 Frequency of alcohol consumption and drunkenness according to target and questionnaire version.

Target	*Median occasions in past 30 days*		*U*	*Z*
	MT	ST		
Frequency of consumption				
Self-referent	1	0	43069[ns]	-1.22
	n=301	n=303		
Peer-referent	4	4	52779[ns]	-0.46
	n=343	n=314		
Frequency of drunkenness				
Self-referent	0	0	40899[ns]	-0.63
	n=343	n=314		
Peer-referent	4	4	52776[ns]	-0.73
	n=345	n=316		

[ns]$p>0.05$. MT/ST: Multiple/single-target versions of the questionnaire; *U*: Mann-Whitney *U* Test; *Z*: *z*-score.

Table 3 Attitude scale score according to target and questionnaire version.

Target	*Mean (SD) attitude-scale score*		*t*	*d (95% CI)*
	MT	ST		
Self-referent	17.8 (4.22) n=352	17.47(4.18) n=347	1.04^{ns}	*d* = 0.08 (95% CI -0.36, 0.52)
Peer-referent	21.2 (4.14) n=352	19.7(4.59) n=347	4.46*	*d* = 0.35 (95% CI 0.02, 0.67)

*p <0.001, ^{ns}p>0.05. MT/ST: Multiple/single-target versions of the questionnaire; *t*: Student's t-test; *d*: Cohen's *d*; CI: Confidence Interval.